



## Course syllabus

Faculty of Technology

Department of Mathematics

4MA101 Analytiska funktioner, 7,5 högskolepoäng

4MA101 Analytic Functions, 7.5 credits

### **Main field of study**

Mathematics

### **Subject Group**

Mathematics

### **Level of classification**

Second Level

### **Progression**

A1N

### **Date of Ratification**

Approved 2009-12-01

Revised 2014-09-03 by Faculty of Technology. Prerequisites, objectives, content, examination and type of instructions.

The course syllabus is valid from autumn semester 2015

### **Prerequisites**

60 credits mathematics including 1MA153 Vector analysis 7.5 credits or equivalent.

## Objectives

The student shall:

- understand the concept of Analytic functions
- be able to derive the Cauchy-Riemann equations
- have knowledge of the elementary analytic functions and their properties
- understand the theory of harmonic functions on domains of arbitrary dimension
- understand complex integration
- understand fundamental integral theorems and some of their consequences
- be able to represent analytic functions as Taylor series and meromorphic functions as Laurent series
- have knowledge of residue theory and its applications
- understand the theory of conformal mappings, in particular Möbius transformations

## Content

The course comprises:

- Analytic, harmonic and meromorphic functions
- Complex integration of analytic functions
- Series representation for analytic functions
- Residue theory
- Zeros of analytic functions
- Conformal mappings
- The maximum modulus principle

## Type of Instruction

Lectures and seminars.

## Examination

The course is assessed with the grades Fail (U), Pass (G) or Pass with Distinction (VG).

On request, students may have their credits translated to ECTS-marks. Such a request must be sent to the examiner before the grading process starts.

The student's knowledge is assessed in the form of oral and/or written examinations. Continuous examination through written and/or oral presentations may also occur.

## Course Evaluation

A course evaluation will be carried out at the end of the course in accordance with the guidelines of the University. The result of the course evaluation will be filed at the department.

## Required Reading and Additional Study Material

### Required reading

- Chen, W. W. L. *Introduction to Complex Analysis*, available online.
- Osborne, A. *Complex Variables and their Applications*, Pearson, 1999.
- Rudin, W. *Real and Complex Analysis*, McGraw-Hill, 1987. 400 pages.
- Handouts.